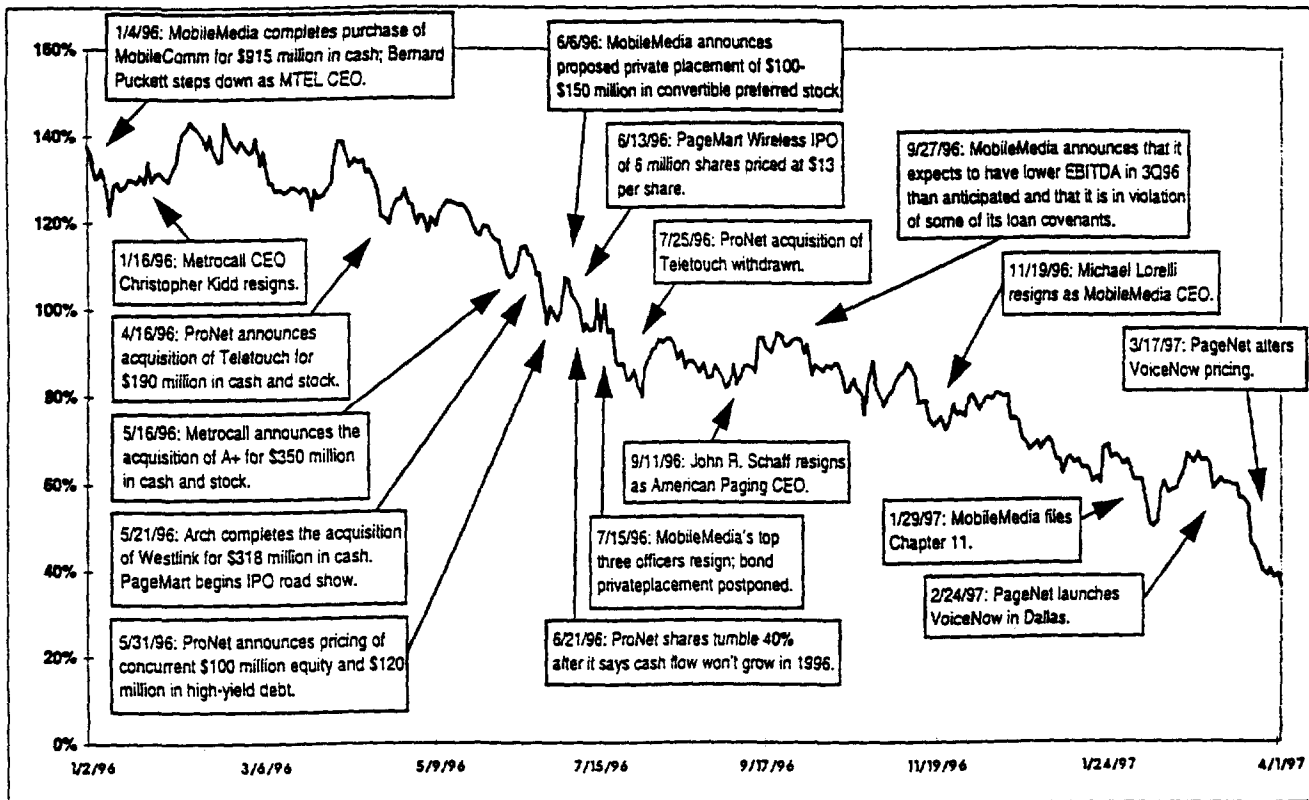


really become a competitive threat; that PageNet's VoiceNow and Mtel's acknowledgment product roll out successfully; and that Arch and others begin generating free cash from operations) could cause investors to take a fresh look at the paging group. For the longer-term committed investor that wants to play this sector, we can't think of a better time to accumulate strong names in the industry than currently.

Weighted Paging Index Performance (January 1995 to March 1997)



Paging Index includes American Paging, Arch Communications, Metrocall, MobileMedia, MTEL, Paging Network, ProNet and Teletouch.

Source: FactSet Research Systems Inc.; Bear, Stearns & Co. Inc.

Domestic News

Metricom appointed four key executive positions in finance, operations/deployment, manufacturing and administration. Vanessa Wittman was appointed vice president of finance; Jim Nelson was appointed vice president of operations; Bob Bickers was appointed vice president of manufacturing; and Bill Swain was appointed vice president of administration, responsible for the Information Services, Human Resources and Facilities organizations.

Priority Call Management optimized its ORYX platform to meet the growing demands of the wireless marketplace. In support of this, Priority unveiled its short message service (SMS) application, which provides one-number, prepaid calling, and enhanced messaging short messages to digital handsets.

Shares of Arch Communications Group increased more than 17 percent on May 23 following a 21 percent jump on May 22. Analysts say the wireless sector appears to be bouncing back after share prices plunged as much as 70 percent in the last 12 months. Arch Communications' shares (NASDAQ - APGR) closed at \$7.50 on May 23, up \$1.12 on volume of 338,900. The average daily volume currently is 161,000.

Donaldson, Lufkin & Jenrette

Donaldson, Lufkin & Jenrette Securities Corporation
200 W. Madison Street, Chicago, IL 60606-3488

Robert A. Moore
Managing Director
Investment Banking
(312) 345-6108

June 9, 1997

Mr. Cecil L. Duffie, Jr.
CONXUS Communications
15 South Main Street
Suite 801
Greenville, South Carolina 29601

Dear Cecil:

At your request we have evaluated the options for the next round of financing that CONXUS will require to proceed with its national build-out. Based on the Company's business plan, there is a capital requirement of approximately \$150 million by the end of 1997 to complete the build-out and solidify your competitive position in the marketplace.

One of the options that we have examined is the Company's ability to access the high yield debt market at some point later this year. As you have made considerable progress from last summer's attempted high yield financing, we believe the market may be more accessible to you now as compared to last year. In addition, many other wireless offerings that were anticipated last year and the "overhang" associated with them had negative implications for your offering at that time. As you know, the buyers for those companies' paper are the same buyers for your securities. One issue we all have to monitor closely is the proposed changes in payment schedules for all C-Block winners. If the payments are delayed, one of the concerns the market may have is that capital raised by C-Block winners will be used to build systems and fund start-up losses. In your case, a portion of the capital will be used to repay FCC debt. All other things being equal, the market will view your situation as much less favorable vis-à-vis the other issuers that you will compete with in the capital markets.

We look forward to working with CONXUS on this project. If you have any further questions, please call me.

Sincerely,

Robert A. Moore

BOB.DOC

06/10/97 TUE 14:30 [TX/RX NO 6230]

Industry Update

Wireless Messaging Industry

Where Does Paging Fit in the Wireless World?

Wireless messaging companies face risks from within the industry over the short term, and from without over the long term, that we do not believe are fully reflected in the stocks. Upon revisiting our industry thesis, we gained a stronger appreciation for the increasing competition within the traditional paging industry, the long-term threat from digital cellular/broadband PCS (BPCS), the lower-quality operating cash flow of paging and the overvaluation of paging relative to cellular. While many argue that paging companies have the potential for high returns, we believe that whatever returns exist are based on optimistic assumptions and are due to high financial leverage, which works both ways.

Our "top-down/bottom-up" subscriber analysis suggests a divergence between total industry expectations and individual company expectations, something which cannot persist. Our analysis indicates that the larger individual operators representing 70% of the industry must "steal" subscribers from the other 30% beginning in 1998 to meet our "conservative" individual company projections. Considering that the other 30% of the industry has never lost subscribers before, we believe it will be difficult for the larger paging companies to simultaneously steal subscribers and maintain stable pricing.

Digital cellular/BPCS, while possibly stimulative over the short term, will become a competitor for subscribers over the long term. We believe that in the next five years digital cellular/BPCS per-minute pricing will fall substantially, first-incoming-minute-free service will become standard, battery life will increase to over one week, and so forth. Also, with 40-50% of the population subscribing to cellular/BPCS service five to 10 years from now and these dynamics in place, where does paging fit in?

Pager leasing inflates operating cash flow margins by 500-1,000 basis points, according to our calculations. We demonstrate that paging and cellular companies follow similar practices with respect to supplying subscriber equipment; however, accounting practices differ such that paging companies capitalize the costs while cellular companies expense costs immediately. As a result, paging companies have lower-quality operating cash flow compared with cellular companies.

Valuations relative to cellular are not attractive. Because both cellular and paging operators are trading at similar multiples of operating cash flow (EBITDA) and paging has lower-quality operating cash flow because of pager leasing, we believe paging operators are overvalued relative to cellular operators.

Table 1: J.P. Morgan Wireless Messaging Coverage

Company	Ticker	Rating	3/25/97 Price	Firm Value	1997E OCF	FV/ OCF	'97-00 CAGR	97 Mult. to LTGR
Arch Communications	APGR	MP	\$5.00	\$1,077.5	\$136.6	7.9	16.1%	49.0%
MobileMedia	MBLM	MP	\$0.88	\$1,189.1	\$136.1	8.7	15.8%	55.3%
Mtel	MTEL	MP	\$6.25	\$1,147.8	\$17.4	65.9	115.3%	57.2%
PageMart	PMWI	L-T Buy	\$4.75	\$545.9	\$(6.4)	NM	NM	NM
PageNet	PAGE	MP	\$8.63	\$2,810.6	\$270.2	10.4	30.3%	34.4%

Source: J.P. Morgan Securities Inc. estimates. Note: FV/OCF reflects equity market capitalization and net debt to operating cash flow. JPMS Rating System: B=Buy, L-T Buy=Long-Term Buy, MP=Market Performer; and UP=Underperformer.

The Telecommunications - Wireless Services Equity Research group recently published the following reports:

Palmer Wireless (2/28)
United States Cellular (2/28)

Telecommunications - Wireless Services Equity Research:

Kurt Abkemeier, CFA
(1-212) 648-9468
Laura Baldwin
(1-212) 648-6271
Michael Rollins
(1-212) 648-6294

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INVESTMENT THESIS

The wireless industry is in the midst of significant change that will require all of the players to consider their shorter- and longer-term competitive positions. While the wireless messaging industry has shorter-term growth ahead of it, the degree of longer-term growth is at risk because of increased competition from within the wireless messaging industry and from without, in the form of digital cellular/BPCS. Unexpected competition in a commodity-like business, such as paging, with significant fixed costs and little profitability without significant volume, could be the backdrop for uneconomic returns for investors.

Positives

Subscriber Growth to Remain Strong Over Shorter Term

Over the short term, the wireless messaging industry still has room for growth. Assuming that digital cellular/BPCS has only a mild effect on wireless messaging, our projections indicate that wireless messaging subscribers can increase from 34.6 million subscribers in 1995 to 77.4 million by 2000. Although we expect net adds from traditional paging to peak in late 1997 or early 1998, we anticipate narrowband PCS to pick up some of the slack. Even though digital cellular/BPCS will likely be a damper over the longer term, we see an opportunity over the shorter term for digital cellular/BPCS to actually have a stimulative effect as awareness of wireless, in general, is heightened.

Wireless Messaging Serves Different Need Than Cellular/Broadband PCS

Wireless messaging is typically used by someone at a fixed location to contact someone who is mobile, while cellular/BPCS is primarily used by someone who is mobile to contact someone at a particular location. As a result, there is a great overlap of cellular and paging users because paging compensates for the weaknesses of analog cellular inbound capabilities. We believe that paging's inbound capabilities will differentiate paging from cellular for the next few years, but over the longer term, digital cellular/BPCS should gain improved inbound capabilities that narrow the relative attractiveness of paging over cellular.

Ability to Mass-Broadcast Information Services

Because pagers are tuned to a specific frequency, it is relatively easy to broadcast the same messages to all subscribers. Distribution of common messages, such as news stories, is both simple and cost-effective. We see this as a potential competitive advantage for paging operators to exploit which can help drive demand for alphanumeric pagers and increase average revenue per unit (ARPU). Over the longer term, digital cellular/BPCS will have the capability and capacity to be able to provide similar services, as well as more customized solutions.

Lower Price Point Than Real-Time Wireless Voice Telephony

Wireless messaging monthly recurring charges, depending on the type of service, typically cost one-fourth that of cellular services. As a result, wireless messaging attracts a different segment of the market that is unwilling or unable to pay roughly \$50 per month for cellular.

Wireless Messaging Operators Tend to Have a Nationwide Footprint

One of wireless messaging's differentiating factors relative to BPCS is that most of the large operators can provide nationwide seamless coverage using one technology. Of those in the broadband world, only Sprint PCS (FON/\$47.63/Buy) and Nextel (NXTL/\$13.63/Buy) can boast of having seamless nationwide resources, but of course, they are not yet fully built out yet. While other cellular/BPCS operators have large footprints, achieving nationwide coverage is only possible through linking networks that do not necessarily allow for the roaming of features. Over the longer term, these issues will likely be worked out among the cellular/BPCS operators.

Risks

See page 19 for our "top-down/bottom-up" analysis

Entire Industry and Individual Company Subscriber Projections Do Not Appear to Add Up
Our "liberal" industry projections and "conservative" individual company subscriber projections indicate that there is not enough room for all companies to meet subscriber growth expectations over the longer term. To meet our industry projections, the larger individual companies representing 70% of the industry must steal from the subscriber base of the other 30% of the industry. The smaller operators in the industry have never collectively lost subscribers and have, in fact, gained subscribers every year. These smaller operators appear to have survived the fierce pricing war of 1996, and we suspect that they will not cede subscribers to the larger players without a bloody fight. For individual companies to meet our subscriber projections, we believe the entire industry must ultimately grow to a higher level beyond our expectations and those of the Street.

See page 29 for a discussion of digital cellular/BPCS

Longer-Term Risk of Competition From Digital Cellular/Broadband PCS

While we do not believe that digital cellular/BPCS will be able to capture successfully a significant portion of the wireless messaging market over the shorter term, we do believe the risk exists that cellular/BPCS can do so over the longer term. We believe that paging companies must devise strategies to differentiate their services from those of digital cellular/BPCS.

Technical Advantages of Wireless Messaging Diminish as Cellular/BPCS Evolves

To date, cellular has been primarily an outbound communications device, compared with paging, which is an inbound communications device. Historically, paging has been a good complement to cellular because it compensated for cellular's weak inbound capabilities. However, cellular/BPCS is evolving in such a way that it can offer nearly all of the same features as paging. Evidence from Scandinavian countries that already use PCS technologies supports this thesis, with subscribers leaving their phones turned on most of the time to receive inbound calls or messages. In the United States, the trend is for cellular/BPCS operators to offer the first incoming minute free or at a reduced rate to incent the subscriber to leave the phone turned on, something which decreases the need for pagers.

Price Advantage of Paging Relative to Cellular/Broadband PCS to Diminish

One of paging's advantages today over cellular is that it costs about \$10 per month compared with about \$50 for cellular/BPCS. Market segmentation based on those who cannot afford cellular probably accounts for some of those who subscribe to paging, but longer term, we see this pricing advantage diminishing. We expect cellular/BPCS per minute pricing to drop by more than 50% over the next five to 10 years, while paging pricing is expected to decline only modestly. We expect this pricing advantage to narrow and for some paging subscribers to cross the chasm into the wireless voice telephony world. In fact, most analysts believe that cellular/PCS will achieve penetration between 40-50% within 10 years, which would represent about 70% of those between the ages of 15 and 60. In light of such high penetration rates for cellular/PCS, significantly lower per minute pricing, significantly improved battery life and more robust networks, where does wireless messaging fit in?

Pricing Pressure Could Hurt Margins

Factors such as a slowing of subscriber growth or exacerbation of competition could drive ARPU down and hurt operating cash flow margins. Since paging operators have relatively large investments in infrastructure that can support more subscribers than are signed up today, their inclination is often to sell airtime at the marginal cost of providing service if excess capacity exists.

See page 44 for a discussion of the effect of resellers on paging operators

Reliance on Resellers May Adversely Impact Pricing

Resellers were certainly price makers, not price takers, during 1996. Because many paging operators do not have enough of their own distribution, they must rely on resellers to acquire new subscribers. Resellers have recently received very low pricing (between \$1 and \$3 per month) for numeric service, as paging operators competed for the business of resellers. Resellers have come to be in this envious position because this is largely a commodity business with little, if any, differentiation between service providers. With 90% of all subscribers using numeric paging, this situation may persist. We believe that alphanumeric services can offer more differentiation than numeric paging, but with alphanumeric paging there still is not a large degree of differentiation. Until there is considerably more differentiation between operators, resellers are likely to have the upper hand when it comes to pricing.

See page 36 for our analysis of the effect of pager leasing

Pager Leasing Obscures the Operating Results of Paging Companies

Our calculations suggest that the accounting convention of capitalizing leased pagers distorts operating cash flow (EBITDA) margins by 500-1,000 basis points. Most paging companies report operating cash flow margins of 25-37%, but we believe "truer" operating cash flow margins lie somewhere in the 18-30% range. Also, some of the operating cash flow margin expansion over the last two years for some paging companies may stem more from the leasing of pagers than the underlying performance of the primary service line of business.

See page 11 for our trading comparable analysis and discussion of paging and cellular valuations

Paging Valuations Appear Expensive Relative to Cellular Valuations

With paging equity values down as far as they have been over the last 18 months, they must certainly be cheap, right? We do not believe they are cheap yet, especially when compared with cellular operating cash flow trading multiples. Nearly all paging companies have adjusted traditional paging trading valuations of about eight times 1997 operating cash flow. This compares with adjusted cellular trading valuations for most rural cellular operators, which also trade at about eight times 1997 operating cash flow. In addition, these cellular operators have higher and expanding operating cash flow margins of 35-45%, positive net income, and the most compelling competitive profile in the cellular industry. Especially because of the effect of pager leasing, we firmly believe that adjusted traditional paging trading valuations should trade at a discount to adjusted cellular trading valuations.

Perception of Digital Cellular/BPCS Risks Likely to Limit Valuations

Whether or not the threat from digital cellular/BPCS is actually real, the perception is that it is real. Until that perception changes, paging stock valuations are unlikely to increase significantly without any catalysts to change the minds of investors. From our perspective, we do see longer-term risks from BPCS. In addition, we believe the perception that digital cellular/BPCS is a threat will continue to hang over the stocks leading us to believe that there will not be much upside in the stocks over the next 12 months.

See page 43 for a discussion of financial leverage

Investors May Be Unwilling to Finance More Capital Requirements

Times have changed for the wireless messaging industry, and so has the ability of paging operators to finance the growth of their businesses. After the experience of MobileMedia, banks and the debt markets are likely to view paging financings with a healthy dose of skepticism. Although the availability of capital has diminished, and may well persist for some time, this should at least have the positive effect of encouraging companies to pursue rational and profitable strategies that produce free cash flow.

WHAT HAS CHANGED IN OUR PERSPECTIVE?

A variety of factors has caused us to rethink our perspective of the wireless messaging industry. None of these factors emerged overnight, but our perspective on some of these issues has slowly evolved over the last few months. As all of these issues collectively reached critical mass, our view on the sector changed from being mildly positive to neutral/slightly negative and resulted in our downgrade of the sector on February 7. Some of the important factors include:

- Competition from within the industry may intensify, as indicated by our "top-down/bottom-up" analysis. There simply may not be enough subscribers for all paging operators to meet expectations.
- Competition from digital cellular/BPCS, while not a short-term risk, is a significant longer-term risk that needs to be addressed by wireless messaging companies.
- Pager leasing distorts operating cash flow (EBITDA) to such an extent that it has made us more uncomfortable with present paging valuations, especially relative to cellular.
- High financial leverage and tightening financing options in a capital-consuming industry are not a great recipe for success.
- Whatever potential equity returns are promised today are primarily a result of high leverage, not the promise of strong business fundamentals.
- Trading multiples, especially relative to cellular, are not very attractive.

What Has Changed Recently to Merit the Downgrade?

Not much, except for our perception of the facts and issues. Just as different people can come to different conclusions after evaluating the same information, our view of the same facts and issues has evolved. We are coming to a different conclusion after viewing pretty much the same facts, except that we have developed a somewhat greater appreciation for a variety of issues including the longer-term threat from digital cellular/BPCS, the potential competition within the industry, the continued diminishing quality of paging companies' balance sheets, and the likely tightening of capital markets for paging companies. With all these issues outstanding, we came to the conclusion that wireless messaging companies are not likely to outperform the market over the short term. Investors have other places to put their money and are unlikely to wait for these companies to resolve these issues.

Isn't This Downgrade a Little Late?

Better late than never. Despite the significant declines in equity prices, it is not easy to make a case that these companies are significantly undervalued considering our revised view of the industry. While equity values have declined significantly, total enterprise values (total net debt and equity) have declined much less. For example, the equity price of Arch Communications is down 75% from about a year ago, while its enterprise value is down only about 25%. With such high leverage, debt accounts for a significant portion of total enterprise value, which may still provide for significant upside or downside. Because of some of the factors delineated above, we see the upside scenario as unlikely and risky until some industry issues are addressed. If some of these industry issues are addressed or change, then we would be willing to reconsider our position.

MAJOR ISSUES TO WATCH

We would keep an eye on several issues over the next 12-18 months that can affect the paging industry:

- Continued perception that broadband PCS is going to "kill" paging
- Progress of narrowband PCS rollouts
- Pricing in the reseller channel
- Subscriber net adds in the paging industry
- Capital availability

Until the above issues can be addressed to alleviate investor concerns, confidence in the wireless messaging industry will remain low. We believe that some of the issues can be addressed but that some of them will be difficult for wireless messaging operators to solve.

See page 29 for our discussion of the threat of broadband PCS

Broadband PCS Cloud Over the Wireless Messaging Industry

Whether or not the threat of digital cellular/BPCS is actually real, the perception is that the risk is real. Until that perception changes, paging stock valuations are unlikely to increase significantly without any catalysts to change the minds of investors. The onus will be on paging companies to prove that digital cellular/BPCS is not a risk, which can only be proven with positive performance over time.

Broadband PCS has been introduced in many major cities, including Washington, D.C., New York, and Dallas, and while it is too early to tell what the actual impact of BPCS has been on paging carriers, we do not believe that it has affected subscriber growth (so far). PageNet even stated recently that in markets where PCS services have been offered for several months (including Virginia and Salt Lake City), PageNet's growth was 32%, vs. 27% in all of its other markets. Even though PageNet reported higher growth in markets where BPCS has been operational during 1996, other factors may account for at least some of the difference in growth rates.

Over the shorter term, we do not believe that broadband PCS will have much, if any, of an impact on paging. In fact, digital cellular/BPCS may even stimulate usage of paging over the shorter term. Paging has shorter-term advantages relative to analog cellular such as longer battery life, higher reliability, and better in-building penetration.

Longer term, however, there is a case to be made that broadband technologies can capture part of the wireless messaging market. Market segmentation will likely maintain some barriers between digital cellular/BPCS and wireless messaging, but the real question is how much of an inroad digital cellular/BPCS may make.

Narrowband PCS Rollouts

Rollout of NPCS has been slower than expected, largely because of the complication of NPCS networks. These are fundamentally very different from traditional paging networks because they have return channels. With traditional paging, operators can get up and running by putting a transmitter on top of a tall building and cranking up the power to cover a 30-mile radius. Two-way NPCS networks require much more finesse and have some resemblances to cellular networks. NPCS operators need to find many sites in a city for transmitters and receivers, similar to cellular. Because frequencies must be reused, NPCS operators must be careful with power levels, just as with cellular. Many sites must be used for the network to be

able to "hear" a transmission coming from the subscriber unit because the unit broadcasts at such a low power level.

The following table contains a comparison of some of the major operators' NPCS rollout plans.

Table 2: Comparison of Narrowband PCS Strategies

	CONXUS				
	Communications	MobileMedia	Mtel	PageMart	PageNet
Licenses	- 50 kHz/50 kHz	- 50 kHz/12.5 kHz	- 50 kHz/50 kHz	- 50 kHz/50 kHz	- 50 kHz/50 kHz
(Nationwide, or Close to)	- 125 kHz/125 kHz (SMR)	- 50 kHz/12.5 kHz	- 50 kHz/12.5 kHz	- 50 kHz	- 50 kHz/50 kHz
			- 50 kHz		- 50 kHz
					- 125 kHz/125 kHz (SMR)
					- 125 kHz/125 kHz (SMR)
Technology	InFLEXion	ReFLEX 25	ReFLEX 50	ReFLEX 25/InFLEXion	InFLEXion/ReFLEX 25
Services	Voice messaging	Data	Data	Data/Voice messaging	Voice messaging/Data
Rollout Date	Six months after PageNet	Unknown	September 19, 1995; "relaunch" 4/97	Early 1998	2/24/97 in Dallas/Fort Worth
Rollout Schedule	All markets within 18 months	Unknown	Still working on improving markets	Undecided	All major markets by end of 1997

Source: Company reports and JPMS forecasts.

CONXUS: Doing "Voice a Little Later Than PageNet"

CONXUS Communications will be launching voice messaging services six months after VoiceNow (PageNet has a six-month exclusivity agreement with Motorola and Glenayre for InFLEXion technology). CONXUS has signed memoranda of understanding with 17 of the top 20 U.S. paging companies to resell its services, including exclusive agreements with Arch, Metrocall, and MobileComm, and has numerous resale arrangements with agents and resellers.

MobileMedia: On Hold

MobileMedia has two nationwide NPCS licenses but does not have sufficient capital to pursue NPCS at this time; the company may actually sell one or both of its licenses for capital.

Mtel: SkyTel 2-Way

Mtel launched its two-way service in September 1995 but has experienced problems with coverage and utility of subscriber devices. The company is planning to relaunch its two-way services in April 1997 with improved coverage, reliability, service offerings and a wider variety of subscriber devices.

PageMart: Delayed Until 1998

PageMart is currently beta testing ReFLEX 25 in both Dallas and Austin but recently announced that it will delay its commercial rollout until early 1998. In its decision to hold off on the rollout, management mentioned that it would like to wait for the next generation of subscriber devices.

PageNet: VoiceNow

PageNet has experienced delays in its rollout of VoiceNow, the first voice messaging service over a two-way network, but finally launched the system commercially in the Dallas/Ft. Worth area on February 24. The company has committed to providing nationwide coverage by the end of 1997.

COMPETITION FROM DIGITAL CELLULAR/BROADBAND PCS

We hold two opinions on the risk of competition from digital cellular/BPCS: one concerning the short term and the other concerning the long term. Our view of the short term has not changed much, if at all; digital cellular/BPCS is not much of a threat. However, our view of the long term has changed; digital cellular/BPCS is only in the infancy stage and, once fully rolled out, will change the dynamics between wireless messaging and wireless voice telephony. Because of this potential shift in the competitive landscape, there are significant implications for the valuations of wireless messaging companies.

Short-Term Threat of Competition From Digital Cellular/Broadband PCS

As we already mentioned, we do not see this as a major threat, and we suspect that most investors would agree that this is not an issue over the next three to five years. The following table presents some of the characteristics of wireless messaging and compares them relative to digital cellular/BPCS over the short term.

Table 18: Comparison of Services Over the Short Term (Three to Five Years)

Type of Characteristic	Characteristic of Wireless Messaging	Characteristics of BPCS/Digital Cellular	Advantage for Wireless Messaging Over Short Term
Direction of Communications	Inbound	Outbound	x
Primary Use	Data	Voice	x
Type of Communication	Non-Realtime	Realtime	x
Coverage (Breadth)	Broad	Limited	x
Coverage (Depth)	Robust	Spotty	x
Nationwide Coverage	Seamless	Patchwork	x
Technology	Single	Multiple	x
Transmission Power	High	Low	x
Broadcast Method	Simulcast	Narrowcast	x
Battery Life	3 Months	3 Days	x
Network Architecture	Broadcast	Narrowcast	x
Cost of Service	About \$10	About \$50	x
Bill Predictability	High	Low	x
Size of Unit	Very small	Small	x

Digital cellular/BPCS may be stimulative over the short term

The conclusion for the investor is that over the next few years, we see wireless messaging and wireless voice telephony as being two distinctly different markets that likely will not step on one another's toes too much. In fact, we would even support the contention that digital cellular/BPCS is potentially stimulative for wireless messaging as awareness of wireless is increased, but only over the shorter term.

*Digital is the enabling technology***Long-Term Threat of Competition From Digital Cellular/Broadband PCS**

The threat over the longer term is where our thinking has changed. Our thinking has evolved to incorporate our view of what we believe wireless services will be like five to 10 years from now. We believe it is important to think of the positioning of wireless messaging relative to wireless voice telephony, not statically as the relationship is today, but in terms of how the two services will be five to 10 years from now. When looked at in this light, we come to the conclusion that some of the future growth of wireless messaging companies is at risk considering the evolution of wireless voice telephony technologies. We believe it is imperative for wireless messaging companies to redefine their industry positions relative to the wireless voice telephony industry to defend their subscribers. Essentially, we have lost some of our confidence in our longer-term subscriber projections for wireless messaging companies and are not likely to regain our faith until wireless messaging operators articulate how they plan to contend with the changing landscape of the wireless industry over the next few years.

What Are Some of the Changing Dynamics in the Wireless Industry?

The wireless voice telephony industry is in the midst of significant change that will cause it to look considerably different by the end of the decade. To illustrate how we see some of these changes evolving, we have provided a table which summarizes the different characteristics of wireless messaging relative to digital cellular/BPCS over the longer term. Notice that the advantages of wireless messaging in the table below diminish from the short-term scenario which was presented in the previous section.

Table 19: Comparison of Services Over the Long Term (Five to 10 Years)

Type of Characteristic	Characteristic of Wireless Messaging	Characteristics of BPCS/Digital Cellular	Advantage for Wireless Messaging Over Long Term
Direction of Communications	Inbound	Outbound/Inbound	
Primary Use	Data	Voice/Data	
Type of Communication	Non-Realtime	Realtime/Non-Realtime	
Coverage (Breadth)	Broad	Broad	
Coverage (Depth)	Robust	Improved	x
Nationwide Coverage	Seamless	Patchwork/More integrated	x
Technology	Single	Multiple/Dual-mode handsets	x
Transmission Power	High	Low	
Broadcast Method	Simulcast	Narrowcast	
Battery Life	3 Months	7 Days	Reduced
Network Architecture	Broadcast	Narrowcast	x
Cost of Service	About \$10	About \$50/lower per minute	
Bill Predictability	High	Higher	
Size of Unit	Very small	Very Small	

Direction of Communication

Prior to narrowband PCS (NPCS), the direction of communication for wireless messaging was solely inbound to the subscriber device. Even after the rollout of NPCCS, wireless messaging communication will remain primarily inbound. When cellular arrived 13 years ago, many thought that analog cellular would render paging useless because it could offer inbound capabilities to the subscriber device. Well, that prediction did not come true, for a variety of reasons. Some of the main reasons were attributable to advantages of pagers over cellular, which were highlighted in Table 18. Essentially, paging was able to fill a void on which cellular could not deliver reliably.

Digital is the agent of change. We believe that the implementation of digital technology will increase the inbound capabilities of digital cellular/BPCS phones. With digital cellular/BPCS subscribers are becoming able to receive numeric messaging, alphanumeric messaging and voice mail notification. With improved inbound capabilities in digital cellular/BPCS phones, the argument that wireless voice telephony subscribers cannot be reached reliably loses some of its strength.

As for wireless voice telephony today, the direction of communication is about 20% inbound/80% outbound. Initial reports from BPCS operators indicate that traffic is changing and approaching more of a 50/50 balance. We believe that over the longer term, wireless voice telephony networks will become much more reliable, that traffic over these networks will become much more balanced, and that subscribers will freely disseminate phone numbers to others and leave their phones on. That begs the question, "Why do I need a pager to tell me that someone wants to contact me when I can just leave my phone on and have the person contact me in one shot?" Does this mean that paging dies completely? Of course not, but it does plant a seed of doubt in our subscriber projections.

Primary Use of Service

Today, the primary use of wireless messaging is data while the primary use of wireless voice telephony is voice. Today, just under 90% of paging subscribers use numeric pagers that display up to 10 numeric characters. Most of the balance of subscribers use alphanumeric services.

By the end of the decade, wireless messaging will still be primarily data-centric, with the exception of wireless voice messaging services such as VoiceNow from PageNet. Wireless voice telephony, however, while still primarily offering voice services, will be able to offer all of the data services, and more, that wireless messaging services can.

Now, let's pick apart why some paging subscribers use the services that they use. About 90% of paging subscribers use numeric pagers, which display only 10 numeric characters. Why? The obvious answer is that the paging subscriber wants others to be able to let him/her know that he/she should contact the sender of the message. What will the need for this type of service be when 40-50% of the U.S. population (a commonly accepted figure) have digital phones with considerably longer battery lives and the ability to receive pages? We believe many people will simply answer calls instead of having to respond to a page to call someone. Does this mean that numeric paging service dies? No, but it puts numeric paging as a standalone service at risk.

What is a paging company to do if this is the case? We see alphanumeric paging as an area that paging operators need to develop aggressively to provide value to subscribers.

Type of Communication

Today, all wireless messaging is non-realtime, while the majority of wireless voice telephony is realtime. One of the selling points of paging is that it is non-realtime and that the subscriber has the discretion to return the message at his/her convenience. Investors on the buy-side are familiar with the concept of non-realtime communication: We on the sell-side often communicate with you through voicemail (or even reports). The investor on the buy-side gets to control when/if to return the call. By the way, call with questions on this report.

Non-realtime and realtime communications appeal to different people. Over the longer term, wireless messaging will have more realtime capabilities while wireless voice telephony will develop and promote more non-realtime capabilities. Market segmentation will allow both wireless messaging companies and wireless voice telephony companies to successfully capture different niches.

Coverage (Breadth)

Both wireless messaging and wireless voice telephony have relatively similar coverage areas, as measured by breadth. With both services, there are some areas with extremely low population densities in which service is unavailable. While cellular breadth of coverage is adequate, it is still in the midst of expanding. As for BPCS, it is only beginning to be rolled out, and it will be quite a while until breadth of coverage approaches that of cellular.

Longer term, breadth of coverage may actually be an advantage for digital cellular/BPCS. Here is the reasoning: with dual-band/dual-mode handsets, digital cellular/BPCS subscribers will be able to roam onto multiple networks, which in the aggregate are likely to have better coverage than any one wireless messaging company. Wireless messaging devices, on the other hand, are tuned to access only one network. There is no concept of roaming. So it will not necessarily matter if BPCS builds out all areas, because the same handset can roam to a cellular network that may cover unserved BPCS areas.

Coverage (Depth)

This measure refers to how good network coverage is in a general area with respect to penetrating buildings, minimizing deadspots, and delivering messages. In general, traditional paging networks provide better in-building penetration, largely because they broadcast messages at a higher power level than cellular/BPCS.

As digital cellular/BPCS develop, depth of coverage is anticipated to improve significantly. Cellular networks are already utilizing microcells that better cover buildings where deadspots existed. The entire concept of PCS is to build more microcells to offer better coverage and improve the reliability of accessing the network.

Traditional paging is not failsafe for message delivery, either. In fact, digital cellular/BPCS have a feedback loop in the message delivery protocol which guarantees message delivery and will deliver messages to the subscriber unit upon reentering the network coverage area. No traditional paging operator can guarantee message delivery because traditional paging networks do not possess feedback loops. NPCS networks do possess feedback loops that will enable wireless messaging companies to provide guaranteed message delivery.

Nationwide Coverage

There is one element to breadth of coverage in which wireless messaging should have a long-term advantage, on average. Most of the large wireless messaging operators have the ability to provide service nationwide on one network. This compares with wireless voice telephony operators who collectively cover the nation, but as single operators only cover particular regions. The exceptions to this would be Sprint PCS and Nextel, which can provide nationwide coverage with one network at one frequency. To the extent that having messages delivered by one carrier on one network is important to subscribers, wireless messaging may be in a better position to deliver.

Technology

This is a good news/bad news story for paging relative to wireless voice telephony. The good news is that all wireless messaging operators in the U.S. use the same (typically Motorola) standards – FLEX, POCSAG, ReFLEX 25, ReFLEX 50, and InFLEXion. As a result, equipment is cheaper because equipment manufacturers can achieve economies of scale.

Wireless voice telephony operators, on the other hand, use a variety of technologies: analog, CDMA, TDMA or GSM. Although wireless voice telephony operators use a variety of technologies, each of the technologies will likely reach critical mass to such a degree that some significant economies of scale are realized. The scale economies just won't be as high as if there were only one technology.

The bad news part of the story for paging operators is that because the technology is uniform for all paging operators, the product is essentially a commodity. This makes it difficult for paging operators to differentiate the service and makes it easier for subscribers to churn to another operator. For digital cellular/BPCS, different technologies are often used by different operators, a factor that may minimize the opportunity for subscribers to churn from one network to another while using the same subscriber device.

Transmission Power

As we mentioned earlier, paging transmits at a higher power than cellular/BPCS. This means that paging signals can travel farther and have a better chance of penetrating buildings where most of us work and live.

Over the longer term, as wireless messaging companies develop two-way networks, those two way networks will begin to resemble cellular networks more and more. Either more transmitters will be constructed and power levels will decrease in transmitters or more receivers will be constructed to receive very low power transmissions from subscriber devices. This is a necessity for the network to become truly two-way and receive messages from subscriber devices.

Broadcast Method

Paging operators simulcast transmissions while cellular networks narrowcast transmissions. With simulcast transmission, the same message is broadcast from multiple transmitters simultaneously. This increases the probability of the message arriving at the subscriber unit because the message is coming from a variety of directions. With narrowcast transmission, one transmitter is used to broadcast a message to a subscriber. On a cellular network, the switch decides which transmitter can best communicate with a subscriber and hands off a subscriber to another cell site if the signal is stronger at another cell site.

Another reason that traditional paging networks use simulcast transmission from multiple transmitters is because the network does not know the location of the subscriber; traditional paging networks do not have a return channel from the subscriber unit to communicate. Narrowband PCS networks will have a return channel, and as a result do not need to simulcast messages but may do so to increase the robustness of the network in delivering messages on the first try. Cellular networks, in contrast to traditional paging networks, have send and return channels. As a result, the cellular network can track a subscriber and deliver a message through the nearest cell site.

Battery Life

There is a great difference between the battery life of paging and cellular today. Battery life for pagers is measured in weeks or months, while for analog cellular phones it is measured in minutes, hours, or days.

But where does battery life evolve from here, and how much "juice" is enough? There are three basic ways to increase battery life in a cellular phone. The first is to improve the energy-storing composites of the battery. The three generations of batteries in use today, in ascending order of battery life, are nickel cadmium, nickel metal hydride, and lithium ion. Not only will these composites improve, but new composites are being developed with better capabilities. The second way to increase battery life is to consume a given amount of energy more efficiently. Digital technologies used by cellular and BPCS are providing about triple the talk and standby times of phones simply because they conserve power better than analog phones. The third method is to simply use larger batteries. This last alternative depends on the desires and needs of the subscriber, but in general, this is the least desirable method of increasing the battery life of a phone.

How much "juice" is enough? We believe that a combination of a week of standby and four hours of talk time is sufficient so that the issue of battery life becomes much less important. Why a week? It fits into a natural cycle of human behavior in which subscribers can consistently put the phone in the recharger cradle, say every Sunday morning. A cycle every two or three days may not be easy enough for most subscribers to follow. Once digital cellular/BPCS subscribers can recharge on a weekly cycle, it probably wouldn't even matter if pager battery life is extended to one hundred years. We believe one week of battery life for rechargeable batteries is enough for most people.

Digital phones are coming out with 8.5 days and even three weeks of standby

Most analog phones today provide 90-120 minutes of talk time or 16 hours of standby, which is not enough by our standard; but battery life is not static. Some digital phones today offer up to 10.5 hours of talk time or 8.5 days of standby. Notice that we highlighted the "or" when we specified battery lives. By our measure, it must be an "and." Even more impressive, at the most recent CTIA convention Philips unveiled a new GSM phone that offers 10 hours of talk time and **three weeks of standby time**. That's right, you correctly read three weeks of standby. This phone is currently available in Europe and should be available in the U.S. by the end of the year. This is a vast improvement over today's widely used analog phones, but these much greater battery lives will be the standard within the next few years with digital technologies and better batteries.

Network Architecture

Paging networks are fundamentally broadcast networks while cellular/BPCS networks are narrowcast networks. With traditional paging, all pagers on a network are tuned into a specific frequency and are programmed to "listen" for specific capcodes that identify messages relevant to that specific pager. With cellular/BPCS, all cellular phones on a network are tuned into a control channel to "listen" until the network notifies the phone to tune into a particular channel to make a connection.

Because of the broadcast architecture of traditional paging networks, it is easy to broadcast the same messages to all subscribers on a network, such as news stories. As long as all pagers have these general capcodes programmed into memory, then all pagers can leverage off of a single transmission. In theory, cellular/BPCS networks could do the same, but they must also use their control channels to communicate with the subscriber devices.

Cost of Service

On average, paging costs about \$10 per month while cellular/BPCS costs about \$50 per month. This differential creates market segmentation for those who simply do not believe cellular/BPCS provides enough value to merit a \$50 per-month cost.

But where is pricing going to be within five to 10 years? Most paging operators would argue that pricing will decline very modestly (excluding the effect of lower pricing to resellers, which is an issue of mix and not pricing). Pricing for cellular/BPCS, however, is likely to fall from \$0.40-0.50 per minute to \$0.05-0.20 per minute within the next five to 10 years. In fact, Palmer Wireless, a cellular operator in Georgia and Alabama, has recently instituted a price plan at \$0.10 per minute, replacing one that was about \$0.30 per minute. Substantially lower per-minute pricing for cellular/BPCS service with only modestly lower paging pricing will lessen the attractiveness of paging relative to cellular/BPCS.

Cellular/BPCS operators also have the ability to improve their competitive position by giving subscribers a bigger bang for the buck by providing more minutes of use for a given monthly fee. As long as the capacity exists on the network, there is little if any incremental cost to provide the extra minutes. Even if there is not enough capacity on the existing network, the operator can spend more capital to install more radios at cell sites to increase capacity where needed. In essence, this is what Palmer Wireless did in the example above. But what can paging operators do? If they already provide flat-rate pricing, the only way to give subscribers a bigger bang for the buck is to lower the monthly fee. If excess capacity exists on the network, the other alternative is to load on more subscribers at a price at least as high as the marginal cost of adding the subscriber to the network. This sounds familiar to what happened to some paging operators in 1996 when paging operators added subscribers to use excess capacity at extraordinarily low pricing because marginal pricing was all that was needed to cover the costs.

Bill Predictability

Paging is typically charged as a flat monthly fee while cellular/BPCS is charged according to usage. As a result, paging bills are more predictable than cellular/BPCS bills. More and more these days, cellular/BPCS operators talk about providing large amounts of minutes at low incremental rates, which will likely increase the predictability of cellular/BPCS bills in the future.

Size of Unit

Pagers are smaller and lighter than most cellular phones today. But what will be the common size of cellular/BPCS phones within five to 10 years? In fact, a Motorola StarTAC phone is not much larger than a Motorola Advisor Gold pager and may even be lighter. The point is that some cellular phones are already in the ballpark today size-wise compared with pagers. Those cellular phones that are on the cutting edge today will be the average phone within a few years – just look at the progress of cellular phones over the last 13 years.

Meeting with Commissioner Susan Ness
June 26, 1997

Ex Parte Presentation
Broadband Personal Communications Services ("PCS")
C and F Block Installment Payment Issues
WT Docket 97-82

Deferral and Restructuring Narrowband PCS Installment Payments

I. Introduction

A. Purpose: CONXUS wants same regulatory treatment provided to broadband C and F Block Broadband PCS licensees in regards to installment payments. Any advantage provide to broadband PCS licensees causes disadvantage to CONXUS. Results in loss of competitive services in short and long term and rapid deployment of service to the consumer. Regulatory parity demands that two services be treated the same.

B. Status of CONXUS Buildout

1. CONXUS, MTEL and PageNet are only ones currently building out.
2. Commercial Service Begin 9/1/97
3. Currently has sufficient funding to build out 12 major metropolitan areas
4. CONXUS needs an additional \$150 million to complete buildout which would cover more than 75% of the nation
5. Difficulty because of lack of equipment and capital -- primarily capital now.

II. CONXUS' Obligations To Government Are Similar in Amount as C Block Winners and Financing for Business Plans Also Are Similar

A. Government Obligations

1. Only 11% of the C Block Winners paid an aggregate net bid greater than CONXUS; the other 89% paid an aggregate amount less than CONXUS
2. Only 2% of the F Block Winners paid an aggregate net bid greater than CONXUS.
3. Of the Winners which acquired both C and F Block Licenses, only 14% paid an aggregate net bid greater than CONXUS.

- B. Financing of Business Plans
 - 1. CONXUS requires approximately \$500 million for capital expenditures to buildout nationwide system
 - 2. Broadband PCS licensee with 800 million population service area requires approximately the same
- III. Narrowband PCS and Broadband PCS Compete for the Same Customers
 - A. Broadband PCS offers one-way paging and voice mail as part of its broader wireless telephone service.
 - B. CONXUS offers voice mail service.
- IV. Narrowband PCS and Broadband PCS Compete In the Same Capital Market for the Same Funds
 - A. Capital market has subset for wireless telecommunications, and it is a shrinking pool of funds
 - B. Stock market in up swing -- paging, cellular, PCS have all been significantly depressed
 - C. Investor of CONXUS, who is also investor in broadband PCS C Block licensee, reduced investment in CONXUS latest financing round and other anecdotal investor information
 - D. Like the broadband PCS C and F Block Licensees, CONXUS has had to pull offerings -- using preeminent investor bankers for offerings
 - 1. \$165 million high yield offering - Summer '96
 - 2. \$35 million redeemable stock offering - Dec. '96

- E. Latest offering commenced in January and just closed last week and raised minimum amount.
 - 1. Wanted to raise \$50 million but lack of confidence that additional capital could be raised.
 - 2. Only 15% of money raised was "new" money -- 85% came from existing stockholders
 - 3. Obtained Vendor Financing in which \$135 million of the \$195 Million vendor financing is contingent on raising additional capital and other performance criteria.
- G. Capital expenditures requirement around \$500 million which may exceed a majority of the C and F Block Licensees Requirements
 - 1. Need to raise additional \$150 million to complete nationwide buildout
 - 2. If no further capital raised, operate in 12 cities
- V. CONXUS Wants Fair and Equitable Treatment
 - A. CONXUS Requires Same Treatment as C/F Block Licensees
 - 1. Critical two years during buildout when have no customers
 - 2. Capital fund raising facilitated upon generating customer base
 - B. CONXUS Would Be Harmed By Preferential Treatment to C/F Block Licensee
 - 1. Upon announcement of any relief to C/F Block will be flood of junk bond offerings which have been pent up awaiting FCC decision
 - 2. Relief only to C/F Block will increase return on investment of these offerings to detriment of other competing offerings

CONXUS COMMUNICATIONS, INC.

PRESENTATION OF JUNE 26, 1997

**OBLIGATIONS OF SMALL BUSINESSES ACQUIRING
NARROWBAND PCS LICENSES AND BROADBAND PCS LICENSES
ARE SIMILAR**

CONXUS Narrowband PCS Net Bid Amount: \$90,927,000

Broadband PCS Net Bid Amounts:

<u>Aggregate Net Bid Amount</u>	<u>By Licensees</u>		<u>Aggregate for Bidders Winning Both C and F Block</u>
	<u>C Block Licensees</u>	<u>F Block Licensees</u>	
\$90 Million +	9	2	5
\$50 Million + to \$90 Million	10	2	4
\$0 to \$50 Million	60	83	26

<u>Aggregate Net Bid Amount</u>	<u>By Licenses</u>	
	<u>C Block Licenses</u>	<u>F Block Licenses</u>
\$100 Million +	27	1
\$50 Million + to \$100 Million	25	0
\$0 to \$50 Million	429	497